1 IMAGING MODULE

1.1 Objectives

1.1.1 Understand and explain basic conventional and digital imaging and how the images are produced.

1.1.2 Understand and explain the various techniques utilized with the capture and storage of digital media.

1.1.3 Understand, demonstrate and be able to explain clarification techniques that apply to Forensic Digital Image Analysis. (i.e. sharpening, brightness, contrast, etc.).

1.1.4 Gain the capability to operate hardware and software utilized in Forensic Digital Image Analysis.

1.1.5 Understand and perform routine maintenance on hardware.

1.1.6 Gain the ability to visualize and comprehend details that can be utilized for image comparisons between known images of people, property and clothing to those of an unknown people, property and clothing.

1.2 Methods of Instruction

1.2.1 Lectures

1.2.1.1 How images, both conventional and digital, are produced.

1.2.1.2 Different types of formats and their uses.

1.2.1.3 Evidence handling and note taking.

1.2.1.4 Proficient use of related software programs.

1.2.1.5 Comparison interpretation.

1.2.1.6 Different methods, utilizing a variety of formats, to output the results of an analysis.

1.2.2 Literature Review

1.2.2.1 Inglis, Andrew F and Luther, Arch C. Video Engineering, 3rd. edition, McGraw-Hill, New Your, 1999

1.2.2.2 Davies, Adrian and Fennessy, Phil. Digital Imaging, 4th. Edition, Focal Press, Oxford, 2001

1.2.2.3 Blitzer, Herbert L and Jacobia, Jack. Forensic Digital Imaging and Photography, Academy Press, San Diego, 2002.

1.2.2.4 Equipment and Software Users Manuals

1.2.2.5 Department of Forensic Science, Digital Evidence Procedures Manual – video sections

1.2.2.6 Department Of Forensic Science, Quality Manual

1.2.2.7 Best Practices for the Retrieval of Video Evidence

1.2.2.8 New Publications as they become available

1.2.3 Training Programs

1.2.3.1 Photoshop Basics—Proficient operation of the software as it pertains to video analysis; to include use of de-interlace, filter routines, levels, layering, stamp tool, etc.

1.2.3.2 SignalScape/ Star Witness Video and Audio system - Proficient operation of software as it pertains to forensic video analysis. Two day class offered by the vendor in the operation of their software programs.

1.2.3.3 Avid Video Analysis System - Proficient operation of software as it pertains to forensic video analysis. Three day class offered by the vendor in the operation of their software programs.

1.2.3.4 Basic Forensic Video and the Law course offered by the Forensic Enforcement/Emergency Services Video Association, (LEVA). Advanced course preferred.

1.2.3.5 Video/ Image Comparison Course offered by LEVA.

1.2.3.6 DPS Video and Audio – Proficient operation of the software as it pertains to video analysis; to include the use of editing tools.

1.2.4 Demonstration

1.2.4.1 Basic clarification techniques will be observed from beginning to end and notes will be taken by the trainee. These requirements will demonstrate that the Trainee complied with the required procedures.

1.2.5 Laboratory Exercises

1.2.5.1 Imaging: Demonstrate the understanding of focal length and exposure and its effects on visual results.

1.2.5.2 Viewing of various types of damaged video recordings to understand the cause and repair needed to restore the media to a condition that permits the recovery of the recorded information.

1.2.5.3 Casework will be completed by the trainee under the direct supervision of the section supervisor; content and technique used will be dependent on the cases submitted. These cases will be made of up both mock and actual cases utilizing a variety of problem solving techniques.

1.3 Evaluation

1.3.1 Oral/ Written examination

1.3.1.1 Oral review on each technique and procedure utilized in this section.

1.3.1.2 Written paper(s) on the history of digital imaging technology or a related topic to be assigned and approved by the section supervisor.

1.3.1.3 Various techniques and terms to be defined both orally and written.

1.3.2 Laboratory Testing

1.3.2.1 Trainee must complete a minimum of 1 year of casework under the direct supervision of the section supervisor. This will include mock and actual cases demonstrating a variety of problem solving solutions.

1.3.3 Oral Exercises

1.3.3.1 Technical review sessions. The trainee MUST successfully complete this portion of the requirements.

1.3.4 Courtroom Exercises

1.3.4.1 Trainee will be required to work a case that is representative of actual casework. Trainee must show the ability to defend the conclusions of the examinations and answer technical questions in a courtroom scenario. The trainee MUST successfully complete this portion of the requirements.

1.4 Examination Questions

1.4.1 Explain how video recordings are produced.

1.4.2 Who are the principle players in the development of the video cassette recorder? Approximately what year was this?

1.4.3 Explain the following terms/techniques:

- Raster
- CRT
- CCD
- Pixel
- Resolution
- Focal Length
- Compression
- Encoding
- Interpolation
- Frame grabber
- Other terms may be added as necessary

1.4.4 Provide a definition for digital Forensic Image Analysis

1.4.5 Explain the difference between conventional and digital images and their capture.

1.4.6 Explain the most common clarification techniques:

- Brightness
- Contrast
- Sharpening
- Levels
- Frame averaging

1.4.7 Explain the most common limitations in Digital Forensic Image Analysis

- Poor quality
- Focal length
- CCD
- Lighting
- Compression

1.4.8 Explain the most common file formats and the difference between each

1.4.9 Name two types of compression methods and explain the difference between them.

♦End